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Summary of Strategies for Planning  
Productivity Improvement and Quality  
Enhancement (PIQE)

(U.S.) National Aeronautics and Space  
Administration, Washington, DC

Apr 86

***NASA/Contractor Team***

***Summary of Strategies for Planning  
Productivity Improvement and Quality  
Enhancement (PIQE)***



**NASA**  
National Aeronautics and  
Space Administration

***APRIL 1986***

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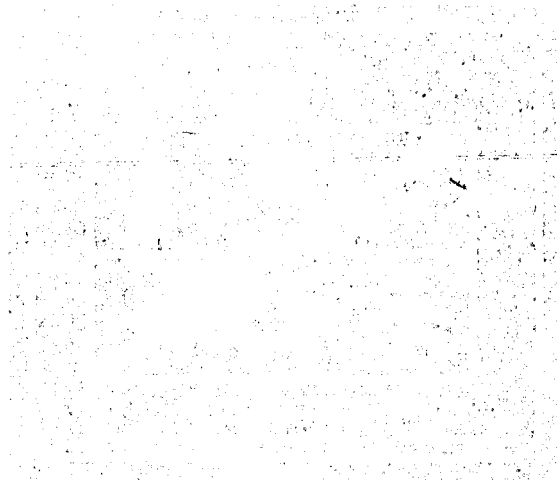
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Productivity Improvement and Quality Enhancement  
(PIQE)***



***APRIL 1986***

**The Office of NASA Productivity Programs  
NASA Headquarters  
Washington, D.C. 20546**

## **Foreword**



The Summary of NASA Strategies for Productivity Improvement and Quality Enhancement respond to NASA's eighth top goal: "Establish NASA as a leader in the development and application of advanced technology and management practices which contribute to significant increases in both Agency and national productivity." The Strategies provide the framework for development of the agency-wide Productivity Improvement and Quality Enhancement (PIQE) Plans.

Imbedded in the Strategies is the belief that an attitude of continuous improvement fostered by managers and an organization is fundamental to productivity improvement. Consequently, implementation of the Strategies offers both growth and opportunity for the organization and the individual. It involves management processes that provide maximum opportunities for the individual to make contributions. In short, the Strategies are aimed at tapping the inherent capabilities of the entire work force.

It is hoped the reader will review this Summary of Strategies carefully, and utilize those ideas and management precepts which may prove to be of value. Successful implementation of these productivity improvement practices across the Agency, and ultimately across the Nation, will lead to a revival of America's leadership in the world.

A large, stylized handwritten signature in cursive script, reading "David Braunstein".

Director  
NASA Productivity Programs  
April 1986

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## ***Introduction***

NASA, in recognition of a growing need to improve the Nation's productivity and enhance the quality of its products and services, initiated the Productivity Improvement and Quality Enhancement (PIQE) Program in 1982. This activity is viewed as permanent and on-going, exemplifying the application of quality enhancement practices which will enable NASA to maintain a leadership role while contributing significantly to the Nation's productivity growth.

The Summary of Strategies for Planning described on the following pages provides the framework and philosophy under which the specific PIQE goals, objectives, and five-year milestones were conceived. It is a pragmatic approach to change. It encompasses in one place the key management-related strategies, initiatives and policy for the PIQE program. The Summary provides the guidelines for the PIQE Program, and is the umbrella under which all installations developed their specific goals, objectives, and five-year milestones. Development of the five-year PIQE Plans by Headquarters and field installations highlights NASA's commitment to long-term productivity strategies and goals, and lays the groundwork for institutionalization of PIQE at NASA.

NASA management recognizes the inherent diversity of missions, work-force composition and objectives of each NASA installation. For this reason, the PIQE program has been structured to permit the decentralization and tailoring of individual PIQE program plans, goals and objectives. Each of the individually tailored plans support the NASA goals and is structured around the "Framework for Action" and nine management themes. The Summary of Strategies for Planning was participatively developed by representatives from each installation and Headquarters.

The NASA Management Instruction (NMI) 1270.1 dated April 5, 1985 (Appendix A) establishes a permanent Office of NASA Productivity. This Office is responsible for the direction, initiation, coordination, monitoring and evaluation of the agency-wide Productivity and Quality Enhancement Initiatives, and reports to the Administrator. The NASA Management Instruction (NMI) 1152.63 (Appendix B) establishes the Productivity Steering Committee. It is chaired by the Administrator and composed of the Officials-in-Charge of Headquarters Offices and Directors of all field installations, and provides the overall policy, goals, and review for the NASA PIQE program. The Director of Productivity Programs reporting to the Administrator provides guidance, integrates the overall NASA PIQE activity, and interfaces with other government agencies and the private sector.

Institutionalization of PIQE in NASA is a primary objective. Although this is the responsibility of management, success in achieving excellence is dependent upon the committed involvement of all work force members.



## **Background**

In 1982, NASA conducted a study of productivity programs in private industry and agency-wide issues around productivity. NASA determined that based on its high visibility and history of excellence in achieving mission success, it could make a significant contribution at the national level to help improve productivity and quality. After the first steering committee meeting of NASA leadership in March 1983, a Productivity Enhancement and Quality Improvement (PIQE) Program was formally initiated. Each NASA installation, in turn, introduced their own PIQE initiatives. Recognizing that the management climate was basic to enhancing productivity, the Administrator issued "NASA's Goals and Objectives" and "NASA's Management Principles for Achieving Excellence" to Officials-in-charge and Directors of field installations in September 1984 (Appendix C).

Following a comprehensive December 1984 study of management practices, the Administrator endorsed the recommendations contained in the report from the NASA Symposium on Quality and Productivity as a "Framework for Action: Improving Quality and Productivity in Government." The nine management themes that evolved from the symposium support the NASA Goals and Objectives and Management Principles, and focus on a management process for continuous improvement. These documents provide the foundation and direction for incorporating an awareness and dedication to productivity enhancement and quality improvement throughout the NASA/Contractor Team.

The Administrator, in April 1985, established a permanent Office of NASA Productivity Programs to provide a leadership role in the development and application of practices contributing to the overall effort. To further emphasize commitment to productivity and quality, the Steering Committee between 1983 and 1985, convened as a group on five separate occasions to oversee and coordinate various elements of major NASA productivity and quality improvement initiatives. To institutionalize PIQE, the Administrator in November 1985 issued a call for each installation to develop a NASA/Contractor Team PIQE Plan with five-year milestones tailored to individual field organizational needs (Appendix D).

In February 1986, the President of the United States signed an Executive Order establishing a government-wide program to improve Federal productivity. This goal — to achieve quality and timeliness gains in products and service, and realize a 20 percent productivity increase in appropriate government functions by 1992 — reinforces NASA's aggressive position in developing and implementing the PIQE initiatives within the Agency and with the NASA/Contractor Team.

## ***NASA's Goals and Objectives***

Intrinsic to NASA's efforts to improve the Nation's productivity and enhance the quality of its products and services is NASA's commitment to agency-wide Goals and Objectives — the eight Goals are listed and described briefly below:

**Goal 1** — Provide for our work force a creative environment and the best of facilities, support services, and management support so they can perform with excellence NASA's research, development, mission, and operational responsibilities. Provide for the development of employees so as to enhance and sustain an integrated work force of highest quality at NASA.

**Goal 2** — Make the Space Transportation System fully operational and cost effective in providing routine access to space for domestic and foreign, commercial, and Governmental users.

**Goal 3** — Develop within a decade a permanently manned Space Station.

**Goal 4** — Conduct an effective and productive aeronautics research and technology program which contributes materially to the enduring preeminence of U.S. civil and military aviation.

**Goal 5** — Conduct an effective and productive Space and Earth Sciences Program which expands human knowledge of the Earth, its environment, the solar system, and the universe.

**Goal 6** — Conduct effective and productive space applications and technology programs which contribute materially toward U.S. leadership and security.

**Goal 7** — Expand opportunities for U.S. private sector investment and involvement in civil space and space-related activities.

**Goal 8** — Establish NASA as a leader in the development and application of advanced technology and management practices which contribute to significant increases in both Agency and national productivity.



## ***NASA Management Principles to Achieve Excellence***

The Principles attest to the team spirit of NASA management and provide the guiding philosophy for achieving the "Framework for Action" initiatives, outlined on the following page.

### **We Demonstrate Belief in our People by:**

- Undertaking inspiring national goals, translating them into challenging objectives at each level, and acknowledging the collective responsibility of managers and team members.
- Demonstrating confidence and respect for all members of the NASA Team, rather than depending upon regulating behavior through excessive rules and regulations.
- Entrusting responsibility and authority to the lowest practicable operating level in order to encourage initiative and pride, and to minimize bureaucracy and paperwork.
- Encouraging honest, open and frequent two-way communication on all matters affecting team members and the work.

### **We Manage for Success by:**

- Hiring a high quality and integrated work force, providing them opportunity for creative and productive work, and maintaining a positive climate for personal development and career growth.
- Stressing world class quality and pride in performance at every working level and recognizing each outstanding contribution.
- Communicating clearly defined goals and focusing on successful performance through systematic program planning and execution.
- Encouraging as much contractor competition as may be appropriate, and executing programs through non-adversarial team efforts.
- Providing the modern equipment needed for quality and productive work to all offices and facilities.

### **We Operate With an Open Management Style by:**

- Recognizing that inherent in R&D are high-risk and high-payoff efforts; maintaining high technical credibility, and improving performance through free and open reviews of technical failures.
- Encouraging those who are responsible for carrying out the work to make suggestions for improvements and participate in the planning.
- Providing ample opportunity for our people to communicate with the best minds in science and technology in other organizations.
- Maintaining integrity in all our dealings with the NASA Team and outside individuals and organizations.

## ***NASA's Framework for Action***

The foundation for internal long-term initiatives of the NASA program for quality and productivity improvements of the work force is embodied in the nine management themes that evolved from the 1984 NASA Symposium on Quality and Productivity. NASA's goal, within the framework of the nine themes, is to provide for our work force a creative environment and the best of facilities, support services, and management support so that they may perform with excellence NASA's research and development mission, and operational responsibilities.

NASA shares responsibility for exceptional performance with the contractor; the productivity improvement program is therefore viewed as a NASA/Contractor team effort for achievement of our goals. A major thrust of the program is the development and implementation of individual PIQE programs throughout the NASA/Contractor community founded on our nine management themes. Where possible, joint initiatives will be taken to demonstrate the significant role the contractor has as a member of the NASA/Contractor team. The nine themes are focused and implemented with emphasis on the following major areas:

- |         |                                                                       |
|---------|-----------------------------------------------------------------------|
| Theme 1 | Involve Top Management To Provide Leadership And Direction.           |
| Theme 2 | Set Team Goals That Promote World Class Levels Of Quality.            |
| Theme 3 | Support New Technology And Modernization In The Organization.         |
| Theme 4 | Create An Innovative And Challenging Team Climate.                    |
| Theme 5 | Use Participative Management Techniques To Increase Contributions.    |
| Theme 6 | Develop Good Communication Among Employees, Vendors, And Contractors. |
| Theme 7 | Stimulate And Promote Individual Talent.                              |
| Theme 8 | Give Priority To Education And Training.                              |
|         | Develop And Implement Means To Evaluate (Measure) Team Performance.   |

# ***NASA Productivity Improvement and Quality Enhancement Management Themes***

## **Theme 1 Involve Top Management to Provide Leadership and Direction**

### **1.1 Communicate Clear Goals and Objectives**

Leadership in R&D program planning and execution is the responsibility of top management at NASA Headquarters and each field installation. Leadership's first step is to assure adequate understanding of NASA goals and objectives so that related and meaningful plans are formulated at each organizational level. This will mean that chosen strategies and goals must be shared with all employees through an intensive communication process. Success of the R&D program is predicated on a team approach; therefore, each field installation must also clearly communicate its goals and objectives to the university and contractor team members.

Top management must discuss with its staff the various agency productivity efforts advocated and emphasize the importance of understanding the program, principles, and goals and objectives necessary to achieve excellence. Management must also encourage improvement goal setting throughout the organization.

Depending on the disciplines involved, top management should review various areas of productivity endeavor with its staff and, in turn, with their subordinate managers. Managers should also monitor and control progress and recognize and reward notable achievements.

### **1.2 Participate in Various Productivity Improvement and Quality Enhancement Symposiums, Conferences, and Meetings**

The Productivity Improvement and Quality Enhancement (PIQE) Steering Committee, formed in December 1982, provides policy guidance and oversees agency-wide productivity initiatives. The Committee is composed of NASA's senior managers and is chaired by the Administrator. It has three major thrusts:

- to establish NASA as a leader in increasing productivity
- to introduce productivity and quality management practices
- to reinforce productivity and assure adequate incentives for the NASA team.

The Semi-Annual Steering and Annual Senior Executives Committee meetings, usually held outside of NASA in industrial locations, help focus the senior management team's discussions on productivity and quality issues with private industry.

The NASA national symposiums provide a forum for discussion of white-collar productivity issues with experienced executives from successful organizations, and produce action items potentially useful to NASA, its contractors and various Presidential Cabinet Councils and Congressional committees.

The annual Spring NASA/Contractor Conference builds a strong interface with the NASA hardware and service/support contractors, and furthers the aims of the NASA/Contractor Productivity Council established early in 1983. Workshops are used to identify impediments to productivity in the NASA/Contractor relationship. Major areas of concern are reviewed and NASA senior leadership is responsible for replying with appropriate actions and initiatives.

### **1.3 Integrate PIQE Planning and Objectives into Day-to-Day Management**

The long-term success of any productivity and quality improvement program is dependent upon an organization's ability to conduct its objectives as a day-to-day management responsibility. Innovation, objectives, measures and rewards must be used effectively to assure routine management support. Management must clearly convey through attitudes, actions, and personal example its commitment to productivity, its strong desire to see active productivity improvement efforts throughout the organization, and its intention to equitably reward, financially and otherwise, notable efforts toward increased productivity. Approaches are to:

- Encourage creative efforts in the process of carrying out the goals of the institution. Enable each level of management to take steps to carry out this philosophy, some of which are to: (1) Provide challenging assignments that stretch individual capabilities; (2) Assign clear responsibilities with emphasis on results; (3) Provide management resources, and remove obstacles; and (4) Accept reasonable management risks that are part of delegation.
- Encourage organizational groups (rather than individuals) to define objectives and measures to monitor productivity improvements. Clarify the fact that self-measurement activities will be aimed at developing self-improvement tools and not for higher level reviews. Measurement must be conducted in a non-threatening environment using participative management techniques.

## ***Theme 2***

### ***Set Team Goals That Promote World Class Levels of Quality***

#### **2.1 Increase Awareness and Understanding of the Need for PIQE**

The Productivity Programs Office sponsors periodic conferences to familiarize NASA employees and contractors with PIQE principles and their application. In addition to the top management meetings cited under Theme 1, these include NASA Employee Teams (NETs), Employee Suggestion Program (ESP) meetings, mini-conferences, and contractor conferences. Outside speakers participate in these programs and field installations are encouraged to invite outside speakers to join in locally instituted programs.

A special two-day productivity seminar which was designed to introduce productivity principles to NASA employees was introduced to NASA installations during 1984 and 1985. It emphasizes participative management practices, measurement techniques, and development of a creative and challenging climate. NASA installations are requested to adopt, initiate, and continue this seminar at the local level.

NASA encourages its staff members to attend and participate in professional association and societal meetings in their particular disciplines. Expansion of this policy should specifically include attendance at productivity meetings conducted by nationally recognized organizations such as the American Productivity Center and the American Productivity Management Association.

NASA installations are requested to disseminate timely productivity printed and video information within their own organizations and make material from local conferences, symposiums, and interviews available to other installations.

#### **2.2 Develop a Continuous Quest for Improvement Within the Organization**

Management is responsible for conveying the message to employees that top performance is directly dependent upon an organization's ability to continuously adapt to new ways to improve its performances. Employees must be challenged successfully on ways to improve productivity and quality.

Responsibility, authority, decision-making, and accountability should be delegated to the lowest levels practical. This "bottoms up" approach is a component of most successful productivity programs. It continually seeks the potential of new concepts and ideas, and ensures involvement of the work force.

### **2.3 Raise Quality Standards and Goals**

Management will strive to set standards and goals that will raise quality and make products more economically feasible for users, both domestic and foreign; it will continue long-term initiatives with NASA employees and contractors to achieve these goals. Employees will be encouraged to participate in setting standards and goals to develop a personal sense of involvement and a commitment to high-quality performance.

Contractors will be encouraged to participate in the NASA Excellence Award for Quality and Productivity, established to recognize outstanding commitments to quality and productivity by contractors, subcontractors, and suppliers. The base of contractor nominees has been expanded by publicizing the program and encouraging contractors to improve their quality and productivity efforts. The criteria for contractor eligibility include: a visible commitment to high quality and productivity, demonstrated customer satisfaction, and verifiable achievements in quality and productivity.



**Theme 3**  
***Support New Technology and Modernization  
in the Organization***

**3.1 Continue Enabling Technologies**

Advances in technology that NASA has helped to create have found rapid implementation in the most visible products: satellites, space flight vehicles, and advanced aircraft. These products demonstrate rapidly increasing levels of productivity in performing their missions — the enabling technology for these gains is the mainstream for many NASA programs, and generates widespread endorsement and support.

**3.2 Support the Productivity-Enhancing Technologies**

In many cases, modified implementations of technology applications developed by NASA result in improved employee productivity. Specific areas where large returns of investment can be achieved are in computer applications to aid employees to work more effectively in the modernization and rehabilitation of facilities and equipment for research, development, and flight operations.

To ensure that the potential benefits of these new technologies are realized, management will apply available resources, changes in work methods and procedures, as well as how work is organized and managed.

**3.3 Pursue Pertinent, High Yield, Non-Mainstream Technologies**

Large returns of investment may require the development of new areas of technology that are not normally pursued in NASA's mainstream efforts, but nevertheless produce enhanced overall productivity and cost-effectiveness. The manufacturing technology of greatest interest is one that focuses on highly specialized processes that reduce barriers to productivity to high-technology products.

## ***Theme 4***

### ***Create an Innovative and Challenging Organizational Climate***

#### **4.1 Encourage Reasonable Risk Taking by Management**

Management must offset the tendency of organizations to lose their entrepreneurial climate as they mature. This can be accomplished by building commitment to the spirit of innovation, using it as a criteria in performance evaluation, and by promoting creativity with personal recognition and rewards. Management will additionally sponsor and provide resources to creative innovators; periodically review activities and ideas whose payoffs are large and warrant risk-taking action; and streamline decision-making.

#### **4.2 Encourage Innovation and Sharing of Responsibility with Contractors**

In order to maximize conditions that could lead to improvements in productivity and quality, management will create conditions that encourage and reward contractors for improvements. Approaches are:

- Remove unneeded layers of NASA management. Reduce processes by which NASA imposes unneeded reviews and procedures, thereby shifting greater responsibility to the contractors. Streamline the acquisition process with emphasis on “what to do” rather than “how to do.” Give contractor teams minimum specifications with more flexibility for trade-offs.
- Encourage gainsharing incentives for the contractor; review the key contracts of major program offices to incorporate incentive clauses where appropriate. Provide for appropriate employee gainsharing among staff members who achieve significant improvements or modifications that result in cost savings to the government.
- Delegate decision-making to challenge people and encourage innovation. Follow the principle of delegating down to the lowest possible organizational level recommendations that affect areas of responsibility in programs and personnel.

#### **4.3 Recognize and Reward Team Efforts**

Management will reward team efforts by assuring adequate distribution of financial rewards for exceptional civil service. It will also assure broad scope of the achievement award system by providing adequate support for awards and increasing personnel awareness of team award opportunities.

**Theme 5**  
***Use Participative Management Techniques***  
***To Promote Employee Involvement and Contribution***

**5.1 Support Employee Participation Techniques**

Management will encourage employees to contribute to improving operations; this is one of the most powerful forces of productive growth and can be supported through quality circles (NETs), Employee Suggestion Programs (ESP), task teams, group meetings, and the nominal group technique of reaching consensus on problem resolution.

Line managers will lend full support to expanding, as appropriate, the three forms of employee teams: NETs within NASA, more integrated NASA/Contractor teams, and on-site contractor quality circles. Recommendations evolving as a result of team or individual efforts deserve rapid responses. Management at all levels will give such recommendations serious consideration.

NASA publishes an annual compilation of improvements in productivity which have been reported by the field installations. Appropriate items will be contributed for maximum effectiveness. Surveys will be taken of reports for local applications of items contributed by other field installations.

The use of nominal group technique (NGT) for resolving controversial issues will be encouraged. The NGT is especially useful for managers seeking to reach group consensus on controversial issues. It is a structured group process whereby decisions are reached from among many alternatives. The specific steps are: silent generation, round robin collection, clarification, prioritized voting, and consensus. Use NGT to reduce impediments, establish productivity trend analyses, involve employees, and resolve issues.

**5.2 Encourage New Ideas and Suggestions for Improvement**

Management will actively encourage and pursue suggestions and ideas from all organization levels to submit new ideas and suggestions. Innovation should be encouraged and there should be no threat of punishment for failure.

Personal awards and decorations should be used extensively as recognition for improvements, e.g. complimentary memos, personal letters, recognition before peer groups, certificates, and mementos. Financial rewards may be used for substantive improvements of notable caliber. Some of the NASA Incentive Awards include the President's Award for Distinguished Federal Civilian Service; Presidential Letters of Commendation, and Presidential Management Improvement Awards. Special

Achievement Awards are lump sum cash awards based on sustained superior performance (SSP) or superior performance of a one-time special act or service, or achievement of a non-recurring nature. The Honor Awards presented at annual NASA-wide ceremonies offer medals designating varying degrees of importance to the recipients; the highest honor that NASA confers is the Distinguished Service Medal (DSM). NASA Certificates bearing the official seal of NASA and signed by the Administrator are also issued as Achievements Awards.

Management will encourage greater participation in employee suggestion programs. Essential to success are: top-level management support; adequate resources; response to suggestions in a reasonable (2-5 weeks) timeframe; solicitation of ideas for savings from contractors, and ideas on recognition and publicity.

Involve middle management in employee participation programs. The middle management level is sometimes bypassed in both directions by employee involvement programs; a serious loss of talent is thus experienced. Involve middle management in all awareness and follow-on programs requiring their support.

### **5.3 Raise Consciousness of Program and Personnel Safety.**

Convey in appropriate meetings and media to both NASA and contractor personnel the essential elements of NASA's safety programs affecting its various missions and related objectives. Accident and incident-free operations lead to lower costs and thus higher productivity.

**Theme 6**  
***Develop Good Communication***  
***Among Employees, Vendors, and Contractors***

**6.1 Implement NASA's Management Principles**

The NASA Management Principles clearly define its management philosophy:

- a belief in people
- an orientation for success
- an open management style.

Communicate the Management Principles to coordinate joint actions among employees, vendors, and contractors. The encouragement of a team attitude that is built on mutual trust and respect is a major tenet of these principles. Senior NASA management will take steps to “teach by example” these principles to all employees.

**6.2 Communicate NASA's Goals and Objectives at Each Level**

NASA's Goals and Objectives must be understood by NASA employees, vendors, and contractors so that they can each have a role in achieving them. Use employee meetings, suggestion programs, and joint NASA/Contractor councils as a means toward this end.

Respond to identified productivity/quality impediments by writing plans, taking action, and reviewing progress. NASA/Contractor councils have been established to identify obstructions to the achievement of NASA's goals of excellence. Council meetings have produced a number of specific recommendations to redress NASA/Contractor impediments to quality and productivity. These recommendations have been studied by Headquarters and the field installations, and have been discussed at the Annual Contractors' Conferences. Management should take the initiative to eliminate these impediments.

## ***Theme 7***

### ***Stimulate and Promote Individual Talent***

#### **7.1 Encourage Delegation**

Management must resist policies, rules, regulations and procedures that discourage decentralization and delegation, and take an active role in removing obstacles that impede creativity. Employees should be challenged at all levels by delegating responsibility and authority, and using participative management styles. Program execution, responsibility, and authority at the field installation and contractor levels will be reinforced, and program formulation, planning review, and evaluation retained at the headquarters level.

#### **7.2 Minimize paperwork**

Management will solicit inputs and suggestions from all organizational elements leading to paperwork reduction; eliminate unnecessary or outdated paperwork requirements; publicize achievements in paperwork reduction.

#### **7.3 Streamline the Procurement Acquisition Review and Approval Process**

Management will examine factors under its control to reduce lead times by taking the following steps: study the flow of procurement paperwork to eliminate unnecessary steps on time intervals; encourage more advanced planning and a spirit of teamwork and good communication among cognizant offices; critique specific major acquisitions; foster an attitude of employee innovation and initiative.

#### **7.4 Reward Individual Effort**

It is the supervisor's duty to motivate, recognize, and reward individual effort for quality and productivity improvements. The execution of this duty will be evaluated as part of the supervisor's performance review.

## ***Theme 8***

### ***Give Priority to Education and Training***

#### **8.1 Encourage Education to Sustain a High Level of Scientific and Engineering Talent**

NASA supports teacher programs such as (a) the NASA Education Workshops for Mathematics and Science Teachers (NEWMASST), a graduate two-week summer workshop program, and (b) Teacher Resource Centers at NASA field installations which are designed to spin off the latest NASA technology into the classroom as quickly as possible.

NASA also supports student programs such as (a) young student awareness programs, i.e., Operation Liftoff, the educational outreach program aimed at stimulating student interest in the study of mathematics and science in 75,000 elementary schools, and (b) summer high school and college apprenticeship programs for scientists and engineers where students work directly with NASA personnel in the everyday working environment.

#### **8.2 Promote Team Approach In Education and Training**

NASA promotes the "team approach" in education and training, and encourages group process training programs within NASA such as NETs to gain expertise in group problem-solving techniques.

NASA has also established a number of internal training programs designed to develop potential managerial talent, and enhance the executive leadership skills of those senior management individuals who are highly trained and motivated. One of the programs offered to NASA staff is the Major Development Fellowship programs, consisting of the MIT-Sloan, Stanford-Sloan, and Harvard University programs. Another is the Simmons College Middle Management program emphasizing management skills and techniques for high potential women. A specific example of an installation staff development program offered to clerical support personnel is the secretarial support staff training seminar introduced at Johnson Space Center.

**Theme 9**  
***Develop/Implement Means to Evaluate (Measure)***  
***Team Performance***

**9.1 Raise Employee Standards, and Establish Level of Group Quality Output**

Management should influence the attainment of higher quality by encouraging employees to set high expectations for their output, i.e., products, and services. Employees should be supported in their attempts to constantly improve their work and their products. One important approach is to develop employees' awareness that higher quality levels drive higher productivity.

**9.2 Define Group Customers and Establish Level of Group Quality Output**

NASA must define levels of quality for all its activities. Stressing quality increases in all organizational elements provides impetus for long-term productivity growth. While the process of improving quality is never ending, at a point in time quality is defined as conformance to customer needs or specifications. In a broader sense, it denotes a measure of excellence.

The concept of organizational quality includes (1) quality of product, (2) quality of service, and (3) quality of management. The organizational products may be hardware, a memo, service, support, or reports submitted to an external organization or internal group. Quality of service in this context means timeliness, customer satisfaction, and resource utilization. Quality of management refers to the proper training, motivation, and reward of the work force and the establishment of an environment to maximize potential. Once having defined the level of quality in the organization, the task would be to measure the trends in attempts to improve the output.

**9.3 Initiate Self-Measures at Functional Group Level**

Management should support the processes for developing micro-measures of productivity and quality at the group level. Results of the white collar study at NASA in 1985 with the American Productivity Center indicate that both our research and administrative groups are capable of developing useful measures. Conclusions are that quality and productivity indicators and measures in predominately white collar environments should be developed by the groups themselves, and the measures should not be used to compare activities. They should be developed for use by the single branch manager to aid their own group. The diversity of goals and efforts dictates this approach. Emphasis should be on employee involvement to stimulate improvement of the group's overall performance. A suggested procedure is: (1) identify the group's customers, both internally and externally, and thus its purpose; (2) Use brainstorming (i.e., nominal group technique) to define the group's output, i.e., pro-



ducts or services, and needed quality levels. Usually outputs can be considered in terms of quantity, quality, performance, and usefulness; (3) Define the input cost of resources and apply the productivity formula:

$$\frac{\text{output}}{\text{input;}}$$

Define appropriate time intervals and measure trends; and (5) Analyze reasons for the trends and take appropriate actions.

## ***Acknowledgment***

The Summary of Strategies for Planning was a joint effort prepared as a guide and reference to NASA's productivity programs, and provides information that we believe will be of great value to the reader.

Special thanks and appreciation for significant contributions are in order for the following members of the NASA/Contractor teams: Joyce Jarrett, Assistant Director of the NASA Office of Productivity Programs, who served as Project Manager and guided this agency-wide effort to completion; Leo Lunine, Jet Propulsion Laboratory, who conceived the idea for the "Informational Check List;" Russ Bardos, NASA Headquarters; William Reynolds, Marshall Space Flight Center; Milton Beheim, Lewis Research Center, and Edward G. Siebert, Grumman Aerospace, who were key members of the writing team.

NASA Productivity Programs staff members who helped in the final preparation of this document are: Jeff Forte, Gene Guerny, Geoff Templeton, Linda Vinson, Catherine Smith and Kim Hudson. Serving in an editorial capacity were Charlotte Marsh, Jet Propulsion Laboratory and Darlene Smith, NASA Headquarters. Others who provided assistance are: Charles P. Boyle, Goddard Space Flight Center; Bill Williams, Langley Research Center; Les Sullivan, Johnson Space Center; Ray Mayfield, NASA Headquarters.

## **APPENDICES A, B, C AND D**



# Management Instruction

APPENDIX A

---

Responsible Office: ADA/Office of NASA Productivity Programs

Subject: DELEGATION OF AUTHORITY--PRODUCTIVITY IMPROVEMENT AND QUALITY ENHANCEMENT PROGRAMS

## 1. PURPOSE

This Instruction establishes the NASA policy, delegation of authority and responsibilities for agencywide management of productivity improvement and quality enhancement programs.

## 2. APPLICABILITY

This Instruction applies to field installations and NASA Headquarters.

## 3. BACKGROUND

During the last decade, the growth of this Nation's productivity has been lower than that of almost every other major technological country. We must reverse this decline which has affected all segments of American industry including aerospace. Within NASA there is a need for greater management and employee participation in efforts to improve quality and enhance productivity. Quality and productivity are the means by which costs are reduced. Productivity programs are utilized to serve as catalysts for the initiation of ideas, projects and new pilot experiments that lead to productivity improvement and quality enhancement within the agency and the nation.

## 4. POLICY

It is NASA policy to be a leader in the development and application of advanced technology and management practices which contribute to significant increases in both agency and national productivity. NASA will provide a participative and challenging environment for all employees so that they have the opportunity to perform the best job they can to feel committed and involved in the organization's success. NASA will develop a team approach with its contractors and support modernization and high quality as a philosophy both internally and externally to achieve the highest levels of productivity. The agency will promote efforts that enhance national productivity.

## 5. DELEGATION OF AUTHORITY

- a. The Administrator establishes agency policy for productivity improvement and quality enhancement programs. Authority for the management of productivity programs is decentralized and delegated to the Associate Administrators, other Officials-in-Charge of Headquarters Offices and the Field Installation Directors so that ongoing activity is conducted by those officials closest to and having the most knowledge of the areas in need of improvement and any impediments to achieving necessary change.
- b. The Director, NASA Productivity Programs, reports to the Deputy Administrator and is delegated the authority for the direction, initiation, coordination, monitoring and evaluation of the agencywide productivity improvement and quality enhancement initiatives. The Director, NASA Productivity Programs, also serves as Executive Secretary of the NASA Productivity Steering Committee.
- c. The NASA Productivity Steering Committee, chaired by the Administrator, consists of the Associate Administrators, other Officials-in-Charge of Headquarters Offices and the Field Installation Directors. It provides leadership and general policy direction of the agency productivity programs. The Committee oversees all programs and demonstrates broad support for agencywide productivity and quality improvements.

## 6. RESPONSIBILITIES

- a. The implementation of productivity improvements and quality enhancements is the responsibility of all NASA employees. Specifically:
  - (1) The Associate Administrators, other Officials-in-Charge of Headquarters Offices and the Field Installation Directors are responsible for providing executive leadership and overall direction to integrate productivity and quality initiatives into all managerial functions of their respective offices.
  - (2) Managers and supervisors are responsible for developing a positive climate for productivity and quality improvements and are accountable for communicating clear goals, focusing on successful programs and encouraging employee participation.
  - (3) Employees are responsible for carrying out the work and making suggestions for work improvements to enhance the quality of work and, in turn, their own performance.

7. REPORTING

The officials to whom authority is delegated in this NMI will assure that feedback is provided to keep the Administrator fully and currently informed of significant actions, problems and other matters of substance related to the exercise of the authority delegated hereunder.



James M. Beggs  
Administrator

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NMI 1152.63

Date April 5, 1985

# Management Instruction

APPENDIX B

Responsible Office: ADA/Office of NASA Productivity Programs

Subject: NASA PRODUCTIVITY STEERING COMMITTEE

## 1. PURPOSE

This Instruction establishes the NASA Productivity Steering Committee as an internal standing committee and defines its functions and membership.

## 2. AUTHORITY

NMI 1150.10, "Establishment and Management of NASA Internal Committees."

## 3. ESTABLISHMENT

The NASA Productivity Steering Committee (hereafter called the "Committee") is hereby established as an internal standing committee. It has been determined by the Administrator that its establishment is necessary in the public interest.

## 4. FUNCTIONS

- a. The NASA Productivity Steering Committee will provide a continuing formal mechanism for oversight of productivity program planning activities and for discussion of major NASA productivity and quality issues. The Committee members will coordinate and integrate the various elements of future program plans in their own organizations and identify future program issues. The Committee will consider issues such as the development of intermediate and long-range strategies and will review new program initiatives.
- b. The Committee will not, in itself, make decisions regarding these matters; however, the members will in their respective capacities implement those decisions made by the Administrator as a result of the Committee activities.

## 5. MEMBERSHIP

- a. The Committee will be composed exclusively of full-time NASA employees; however, non-NASA employees may be invited to participate as advisers, observers or consultants.

April 5, 1985

- b. The Committee is chaired by the Administrator. The Director, NASA Productivity Programs, serves as the Executive Secretary.
- c. The membership of the Committee is set forth in Attachment A.

6. MEETINGS

Meetings of the Committee will be held at the call of the Chairperson.

7. SUBGROUPS

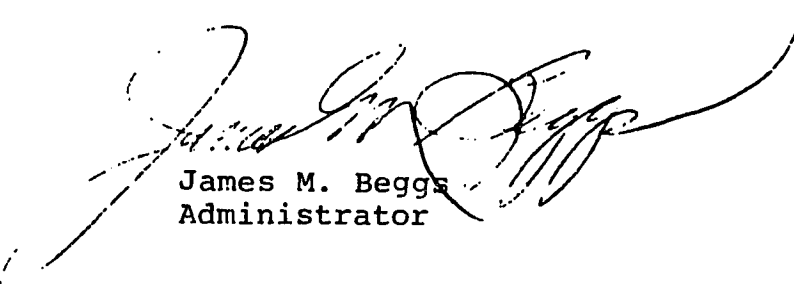
The Chairperson is authorized to establish subgroups of the Committee in accordance with NMI 1150.10.

8. RECORDS

Records of each Committee meeting will be kept and contain, as a minimum, listings of the persons present and the actions assigned. All records and files of the Committee will be retained by the Executive Secretary.

9. DURATION

The Committee will remain in existence for 2 years from the date of the NMI approval unless terminated or extended.



James M. Beggs  
Administrator

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April 5, 1985

ATTACHMENT A  
NMI TT52. 63

MEMBERSHIP OF THE NASA PRODUCTIVITY STEERING COMMITTEE

CHAIRPERSON: Administrator

EXECUTIVE SECRETARY: Director, NASA Productivity Programs

MEMBERS:

- Deputy Administrator
- Associate Deputy Administrator
- NASA Comptroller
- Chief Engineer
- Associate Administrator for Space Science and Applications
- Associate Administrator for External Relations
- Associate Administrator for Space Flight
- Associate Administrator for Management
- Associate Administrator for Aeronautics and Space Technology
- Associate Administrator for Space Station
- Associate Administrator for Space Tracking and Data Systems
- Assistant Administrator for Procurement
- Field Installation Directors
- Observer - Jet Propulsion Laboratory



National Aeronautics and  
Space Administration

Washington, D.C.  
20546

Office of the Administrator

SEP 21 1984

APPENDIX C

TO: Officials-in-Charge of Headquarters Offices  
Directors, NASA Field Installations

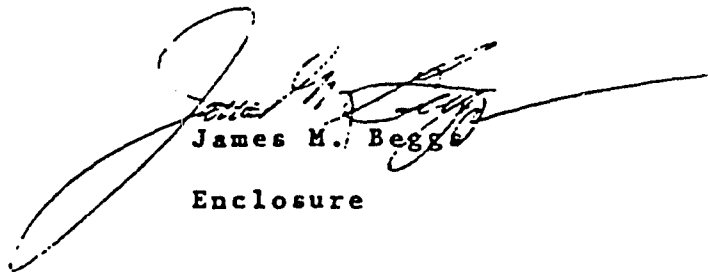
FROM: A/Administrator

SUBJECT: NASA Management Principles to Achieve Excellence

Enclosed is a statement of management principles that I would like to be communicated to all employees. They were formulated, with your help, to explicitly state our long term management approach and commitment. I believe these principles are key to building and maintaining a work environment which encourages the pursuit of excellence by us all.

It goes without saying that good management is fundamental to quality efforts and productive work. The proper communication and reinforcement of these principles will help create a consistent set of Agency-wide management values. New employees should become familiar with the enclosed statement, and we should take steps to incorporate them into our training programs.

It would be appropriate for you to personally endorse this statement of principles in your organizational element and to encourage your subordinates to discuss them with all employees.



James M. Beggs

Enclosure

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Officials-in-Charge of Headquarters Offices

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E/Dr. Edelson  
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G/Mr. Hosenball  
H/Adm. Evans  
I/Mr. Gillam  
L/Mr. Templeton  
M/Mr. Moore  
N/Mr. Nysmith  
P/Dr. McDonald  
R/Dr. Martin  
S/Mr. Culbertson  
T/Mr. Aller  
U/Dr. Jenkins  
W/Ms. Brown

Director, NASA Field Installations

ARC/Dr. Ballhaus  
GSFC/Dr. Hinners  
JPL/Dr. Allen  
JSC/Mr. Griffin  
KSC/Mr. Smith  
LaRC/Dr. Hearth  
LeRC/Mr. Stofan  
MSFC/Dr. Lucas  
NSTL/Mr. Hlass

## NASA'S MANAGEMENT PRINCIPLES TO ACHIEVE EXCELLENCE

### We Demonstrate Belief In Our People By:

Taking on inspiring National goals, translating them to challenging objectives at each level, and acknowledging the collective responsibility of managers and team members.

Demonstrating confidence and respect for all members of the NASA Team, rather than depending upon regulating behavior through excessive rules and regulations.

Entrusting responsibility and authority to the lowest practicable operating level in order to encourage initiative and pride and to minimize bureaucracy and paperwork.

Encouraging honest, open and frequent two-way communication on all matters affecting team members and the work.

### We Manage For Success By:

Hiring a high quality and integrated work force, providing them opportunity for creative and productive work, and maintaining a positive climate for personal development and career growth.

Stressing world class quality and pride in performance at every working level and recognizing each outstanding contribution.

Communicating clearly defined goals and focusing on successful performance through systematic program planning and execution.

Encouraging as much contractor competition as appropriate, and executing programs through non-adversarial team efforts.

Providing to all offices and facilities the modern equipment needed for quality and productive work.

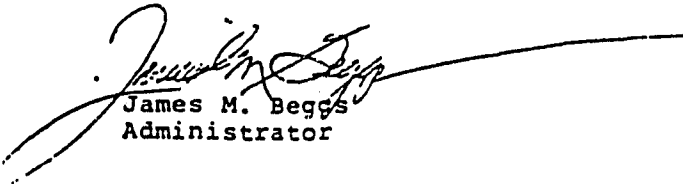
### We Operate With An Open Management Style By:

Recognizing that inherent in R&D are high-risk and high-payoff efforts, and maintaining high technical credibility and improving performance through free and open reviews of technical failures.

Encouraging those who are responsible for carrying out the work to make suggestions for improvements and participate in the planning.

Providing ample opportunity for our people to communicate with the best minds in science and technology in other organizations.

Maintaining integrity in all our dealings with the NASA Team and all outside individuals and organizations.



James M. Beggs  
Administrator

September 1984



National Aeronautics and  
Space Administration

Washington, D.C.  
20546

Office of the Administrator

APPENDIX D

OCT 18 1985

TO: E/Associate Administrator for Space Science & Application  
M/Associate Administrator for Space Flight  
N/Associate Administrator for Management  
R/Associate Administrator for Aeronautics & Space Technology

FROM: A/Administrator

SUBJECT: NASA/Contractor Team Productivity Improvement and Quality  
Enhancement (PIQE) Program, Request for Plans

For the past six months, the Installation Productivity Focal Points have been developing an approach to institutionalize our PIQE plans and activities. As a result of this effort, the enclosed "Guidelines for Developing NASA/Contractor Team PIQE Plans" and an Informational Checklist, were prepared to assist each installation in developing individually tailored PIQE plans. The nine management themes that evolved from the 1984 NASA Symposium on Quality and Productivity, which were published in, "A Framework for Action: Improving Quality and Productivity in Government and Industry" form the foundation for the Guidelines. The Guidelines are responsive to NASA's Management Principles for Achieving Excellence and are key to building and maintaining a work environment which encourages the pursuit of excellence.

Each installation is requested to develop its own NASA/Contractor Team PIQE plans with five-year milestones. These plans should contain goals tailored to internal organizational needs and also should demonstrate how they will support NASA's goals. The Institutional Associate Administrators are responsible for the overall coordination, review, submission, and tracking of performance of the PIQE plans for their designated field installations. Similarly, the Associate Administrator for Management is responsible for the PIQE plans for all Headquarters Offices. The Office of Productivity Programs is responsible for the preparation of a consolidated NASA PIQE plan and an annual progress report.

Your consolidated plans should be submitted to the Office of NASA Productivity Programs, Code ADA, by December 15, 1985. Any questions should be directed to Joyce Jarrett (453-8429).



James M. Beggs

Enclosures

cc: Officials-in-Charge of Headquarters Offices  
Directors of NASA Field Installations

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L/Mr. DeCair  
P/Dr. McDonald  
S/Mr. Culbertson  
T/Mr. Aller  
U/Dr. Jenkins  
W/Mr. Colvin

### Directors of NASA Field Installations

ARC/Dr. Ballhaus  
GSFC/Dr. Hinnens  
JPL/Dr. Allen  
JSC/Mr. Griffin  
KSC/Mr. Smith  
LaRC/Mr. Petersen  
LeRC/Mr. Stofan  
MSFC/Dr. Lucas  
NSTL/Mr. Hlass

### Focal Point Individuals (FPI's)

ARC/200/Mr. W. Ahtye  
GSFC/200.7/Mr. C. Boyle  
JPL/180-900/Mr. F. Felberg  
JSC/BA/Dr. W. Young  
KSC/AC-IMO/Mr. W. Camp  
LaRC/120/Mr. B. Williams  
LeRC/3-7/Mr. M. Beheim  
MSFC/EM-01/Mr. W. Reynolds  
NSTL/GA10/Mr. R. Carter  
HDQ/N/Mr. R. Mayfield

October 1985

GUIDELINES FOR DEVELOPING NASA/CONTRACTOR TEAM  
PIQE PLANS

1. Involve Top Management to Provide Leadership and Direction
  - o Communicate Clear Goals and Objectives
  - o Participate in Various PIQE Meetings
  - o Integrate PIQE Planning into Day-to-Day Management
2. Set Team Goals that Promote World Class Levels of Quality
  - o Increase Awareness and Understanding of the Need for PIQE
  - o Develop a Continuous Quest for Improvement Within the Organization
  - o Raise Quality Standards and Goals
3. Support New Technology and Modernization in the Organization
  - o Continue Enabling Technology
  - o Apply Investment Capital
  - o Pursue Pertinent High-Yield Non-Mainstream Technology
  - o Support the Productivity Enhancing Technologies -- Computers, Facilities, and Manufacturing
4. Create an Innovative and Challenging Team Climate
  - o Encourage Reasonable Risk Taking by Management
  - o Encourage Innovation with Contractors
  - o Streamline Management Processes
  - o Recognize and Reward Team Efforts
5. Use Participative Management Techniques to Increase Contributions
  - o Support Employee Participation Techniques
  - o Encourage New Ideas and Suggestions for Improvement
  - o Raise Consciousness of Program and Personnel Safety
6. Develop Good Communication Among Employees, Vendors, and Contractors
  - o Implement NASA's Management Principles
  - o Communicate NASA's Goals and Objectives at Each Level
  - o Handle Impediments by Planning, Taking Action, and Reviewing Progress
7. Stimulate and Uncork Individual Talent
  - o Encourage Delegation
  - o Minimize Paperwork
  - o Streamline the Procurement Acquisition Review and Approval Process
  - o Reward Individual Effort
8. Give Priority to Education and Training
  - o Upgrade Skills for Employees
  - o Encourage Education to Obtain More New Scientists and Engineers
  - o Promote "Team Approach"
9. Develop and Implement Means to Evaluate (Measure) Team Performance
  - o Allow Functional Groups to Determine Self Measures
  - o Define Levels of Group Quality Output
  - o Raise Employee Awareness for Higher Quality Outputs

Enclosure 1

# NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

## INFORMATIONAL CHECK LIST

1. Involve top management
2. Communicate goals and objectives
3. Communicate need for continuous improvement
4. Discuss productivity efforts with staff
5. Encourage lower-tier goal setting
6. Review PIQE progress periodically
7. Administer recognition and rewards
8. Participate in PIQE meetings
9. Respond to contractor major areas of concern
10. Integrate PIQE planning in day-to-day management
11. Encourage innovation in day-to-day management
12. Enable lower tiers of management to implement innovation
13. Reward excellence through support and incentives
14. Set world class quality goals and standards
15. Increase awareness and understanding
16. Hold local meetings and invite outside speakers
17. Initiate and continue the two-day seminar for middle managers
18. Distribute timely management information
19. Participate in professional productivity association meetings
20. Develop a competitive mentality
21. Optimize use of resources
22. Establish high-performance standards
23. Promote excellence in products and personnel
24. Delegate to the lowest practical level
25. Manage time resources effectively
26. Eliminate non-productive efforts
27. Seek new concepts and ideas
28. Develop long-term initiatives for quality improvement
29. Support contractor participation in NASA PIQE excellence award
30. Continue enabling technology
31. Understand need for management support and investment capital
32. Pursue high yield, non-mainstream technology
33. Support the technology: computers, facilities, manufacturing
34. Create an innovative and challenging organization climate
35. Encourage reasonable risk taking
36. Encourage technical innovation
37. Identify and train those with potential
38. Give more freedom
39. Pursue high-payoff ideas
40. Eliminate needless reports
41. Encourage innovation with contractors
42. Include incentive clauses contracts
43. Encourage gainsharing for contractor improvement
44. Streamline NASA specifications
45. Streamline organization management processes
46. Delegate reward system decisions
47. Apply investment capital
48. Encourage a team attitude
49. Recognize and reward team efforts, individual successes
50. Broaden the civil service system
51. Use participative management techniques
52. Be responsive to NETs and ESP recommendations
53. Expand NETs and quality circles
54. Encourage greater participation in NETs and ESP
55. Encourage use of group techniques
56. Support productivity enhancing technology
57. Contribute to annual PIQE report
58. Review other contributions in PIQE report
59. Involve middle managers
60. Raise consciousness of the safety philosophy
61. Develop good communication among employees, vendors, contractors
62. Implement NASA's Management Principles
63. Communicate NASA's Goals Objectives
64. Respond to identified NASA/contractor impediments
65. Stimulate individual talent
66. Review, remove impeding policies, rule, regulations, procedures
67. Establish management committees with authority to remove impediments
68. Make visible commitment to reduce paperwork
69. Elicit ideas for paperwork reduction
70. Publicize achievements in paperwork reduction
71. Streamline the procurement acquisition process
72. Study the flow of paperwork
73. Eliminate or reduce steps on time intervals
74. Encourage advanced procurement planning and spirit of teamwork among offices
75. Critique specific major acquisitions
76. Give priority to education and training
77. Promote 40 hours of training per employee per year
78. Upgrade clerical and secretarial skills
79. Write training and development goals into performance plans
80. Support new teacher workshops
81. Support educational outreach programs
82. Support teacher resources centers
83. Encourage increases in number of new scientists and engineers
84. Promote team approaches in education and training
85. Develop quality and productivity measures
86. Define levels of group quality output
87. Encourage functional groups to determine self-measures